Industrial Machinery Installation, Repair, and Maintenance Workers, Except Millwrights

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Significant Points

- Highly skilled mechanics usually learn their trade through a 4-year apprenticeship program, while lower skilled maintenance workers receive short-term on-the-job training.
- Employment is projected to grow more slowly than average, but applicants with broad skills in machine repair and maintenance should have favorable job prospects.
- Unlike many other manufacturing occupations, these workers usually are not affected by seasonal changes in production.

Nature of the Work

A wide range of employees is required to keep sophisticated industrial machinery running smoothly—from highly skilled industrial machinery mechanics to lower skilled machinery maintenance workers who perform routine tasks. Their work is vital to the success of industrial facilities, not only because an idle machine will delay production, but also because a machine that is not properly repaired and maintained may damage the final product or injure an operator.

The most basic tasks in this process are performed by *machinery maintenance workers*. These employees are responsible for cleaning and lubricating machinery, performing basic diagnostic tests, checking performance, and testing damaged machine parts to determine whether major repairs are necessary. In carrying out these tasks, maintenance workers must follow machine specifications and adhere to maintenance schedules. Maintenance workers may perform minor repairs, but major repairs are generally left to machinery mechanics.

Industrial machinery mechanics, also called industrial machinery repairers or maintenance machinists, are highly skilled workers who maintain and repair machinery in a plant or factory. To do this effectively, they must be able to detect minor problems and correct them before they become major problems. For example, after hearing a vibration from a machine, the mechanic must decide whether it is due to worn belts, weak motor bearings, or some other problem. Computerized maintenance, vibration analysis techniques, and self-diagnostic systems are aiding in this task, but mechanics still need years of training and experience to perform effectively.

After diagnosing the problem, the industrial machinery mechanic disassembles the equipment to repair or replace the necessary parts. When repairing electronically controlled machinery, mechanics may work closely with electronic repairers or electricians who maintain the machine's electronic parts. (Statements on electrical and electronic installers and repairers, as well as electricians, appear elsewhere in the *Handbook*.) Increasingly, mechanics need electronic and computer skills in order to repair sophisticated equipment on their own. Once a repair is made, mechanics perform tests to ensure that the machine is running smoothly.

Although repairing machines is the primary responsibility of industrial machinery mechanics, they also may perform preventive maintenance and install new machinery. For example, they adjust and calibrate automated manufacturing equipment, such as industrial robots. As plants retool and invest in new equipment, they increasingly rely on mechanics to properly situate and install the machinery. In many plants, this has traditionally been the job of millwrights, but mechanics are increasingly called upon to carry out this task. (See the statement on millwrights elsewhere in the *Handbook*.)

Industrial machinery mechanics and machinery maintenance workers use a variety of tools to perform repairs and preventive maintenance. They may use a screwdriver and wrench to adjust a motor, or a hoist to lift a printing press off the ground. When replacements for broken or defective parts are not readily available, or when a machine must be quickly returned to production, mechanics may sketch a part to be fabricated by the plant's machine shop. Mechanics use catalogs to order replacement parts and often follow blueprints and engineering specifications to maintain and fix equipment. By keeping complete and up-to-date records, mechanics try to anticipate trouble and service equipment before factory production is interrupted.

Working Conditions

In production facilities, these workers are subject to common shop injuries such as cuts, bruises, and strains. They also may work in awkward positions, including on top of ladders or in cramped conditions under large machinery, which exposes them to additional

After diagnosing a problem with an industrial machine, the industrial machinery mechanic disassembles the equipment and repairs or replaces the problem parts.

hazards. They often use protective equipment such as hardhats, safety glasses, steel-tipped shoes, hearing protectors, and belts.

Because factories and other facilities cannot afford to have industrial machinery out of service for long periods, mechanics may be called to the plant at night or on weekends for emergency repairs. Overtime is common among industrial machinery mechanics; about 33 percent work over 40 hours a week.

Employment

Industrial machinery installation, repair, and maintenance workers, except millwrights held about 289,200 jobs in 2002. Of these, 197,300 were held by the more highly skilled industrial machinery mechanics, while machinery maintenance workers accounted for 91,900 jobs. Two out of three workers were employed in the manufacturing sector, in industries such as food processing, textile mills, chemicals, fabricated metal products, motor vehicles, and primary metals. Others worked for government agencies, public utilities, mining companies, and other establishments in which industrial machinery is used.

Training, Other Qualifications, and Advancement

Machinery maintenance workers typically receive short-term on-the-job training in order to perform routine tasks, such as setting up, cleaning, lubricating, and starting machinery. This training may be offered by experienced workers, professional trainers, or product representatives.

Industrial machinery mechanics, on the other hand, often learn their trade through 4-year apprenticeship programs that combine classroom instruction with on-the-job-training. These programs usually are sponsored by a local trade union. Other mechanics start as helpers and learn the skills of the trade informally or by taking courses offered by machinery manufacturers and community colleges.

Mechanics learn from experienced repairers how to operate, disassemble, repair, and assemble machinery. Classroom instruction focuses on subjects such as shop mathematics, blueprint reading, welding, electronics, and computer training.

Employers prefer to hire those who have completed high school or technical college and have taken courses in mechanical drawing, mathematics, blueprint reading, computers, and electronics. Mechanical aptitude and manual dexterity are important characteristics for workers in this trade. Good physical conditioning and agility also are necessary because repairers sometimes have to lift heavy objects or climb to reach equipment.

Opportunities for advancement are limited. Machinery maintenance workers may gain additional skills to make more complex repairs to machinery or work as supervisors. Industrial machinery mechanics also may advance either by working with more complicated equipment or by becoming supervisors. The most highly skilled repairers can be promoted to master mechanic or can become machinists, millwrights, or tool and die makers.

Job Outlook

Employment of industrial machinery installation, repair, and maintenance workers, except millwrights is projected to grow more slowly than the average for all occupations through 2012. Nevertheless, applicants with broad skills in machine repair and maintenance should have favorable job prospects. Many mechanics are expected to retire in coming years, and employers have reported difficulty in recruiting young workers with the necessary skills to be industrial machinery mechanics. Most job openings will stem from the need to replace workers who transfer to other occupations or who retire or leave the labor force for other reasons.

As more firms introduce automated production equipment, these workers will be needed to ensure that these machines are properly maintained and consistently in operation. However, many new machines are capable of self-diagnosis, increasing their reliability and somewhat reducing the need for repairers. Increasing imports and the relocation of production facilities abroad also are expected to dampen employment growth for these workers.

Unlike many other manufacturing occupations, industrial machinery installation, repair, and maintenance workers, except millwrights are not usually affected by seasonal changes in production. During slack periods, when some plant workers are laid off, mechanics often are retained to do major overhaul jobs and to keep expensive machinery in working order. Although these workers may face layoff or a reduced workweek when economic conditions are particularly severe, they usually are less affected than other workers because machines have to be maintained regardless of production level.

Earnings

Median hourly earnings of industrial machinery mechanics were $18.26 in 2002. The middle 50 percent earned between $14.62 and $22.95. The lowest 10 percent earned less than $11.91, and the highest 10 percent earned more than $27.48.

Machinery maintenance workers earned less than the higher skilled machinery mechanics. Median hourly earnings of machinery maintenance workers were $15.63 in 2002. The middle 50 percent earned between $12.11 and $19.81. The lowest 10 percent earned less than $9.57, and the highest 10 percent earned more than $24.19.

Earnings vary by industry and geographic region. Median hourly earnings in the industries employing the largest numbers of industrial machinery mechanics in 2002 are shown below:

Electric power generation, transmission, and distribution	$26.25
Motor vehicle parts manufacturing	22.02
Local government	19.14
Converted paper products manufacturing	18.04
Machinery, equipment, and supplies merchant wholesalers	15.93

About 26 percent of industrial machinery installation, repair, and maintenance workers, except millwrights are union members. Labor unions that represent these workers include the United Steelworkers of America; the United Automobile, Aerospace, and Agricultural Implement Workers of America; the International Association of Machinists and Aerospace Workers; the United Brotherhood of Carpenters and Joiners of America; and the International Union of Electronic, Electrical, Salaried, Machine, and Furniture Workers.

Related Occupations

Other occupations that involve repairing and maintaining machinery include aircraft and avionics equipment mechanics and service technicians; automotive service technicians and mechanics; diesel service technicians and mechanics; elevator installers and repairers; heating, air-conditioning, and refrigeration mechanics and installers; heavy vehicle and mobile equipment service technicians and mechanics; machinists; maintenance and repair workers, general; millwrights; and small engine mechanics.

Sources of Additional Information

Information about employment and apprenticeship opportunities may be obtained from local employers, from local offices of the State employment service, or from:

➤ United Brotherhood of Carpenters and Joiners of America, 101 Constitution Ave. NW., Washington, DC 20001. Internet: **http://www.carpenters.org**

➤ National Tooling and Machining Association, 9300 Livingston Rd., Fort Washington, MD 20744. Internet: **http://www.ntma.org**